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(54) MEDICAL PENDANT BOX BODY AND POST USED FOR MEDICAL PENDANT BOX BODY

(57) A medical pendant box body (10) and a post (2) used for the medical pendant box body (10). The medical pendant box body (10) comprises at least two panels (1), at least two posts (2) extending along the longitudinal direction of the medical pendant box body (10)., an upper base plate (3) and a lower base plate (4). The at least two panels (1) are respectively fixed to the at least two posts (2), and the upper base plate (3) and the lower base plate (4) are respectively fixed to an upper edge and a lower edge of each panel (1) within the at least two panels (1). At least one post (2) within the at least two posts (2) is provided with an electrical interface. The electrical interface comprises an inner groove (21) located on the post (2) and extending along the longitudinal direction of the post (2), an insulator (22) accommodated within the inner groove (21), and a conductor (23) sealed within the insulator (22). The medical pendant box body (10) and the post (2) used for the medical pendant box body (10) have the following advantageous technical effects: a standardised interface can be provided, it is not necessary to connect electrical cables in a complicated manner, disassembly is easy, and the position of a medical accessory can be freely adjusted.

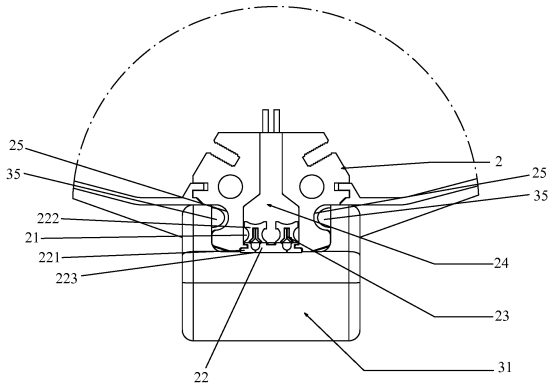

FIG. 4

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Description

[0001] The present application claims the priorities of Application No. 201410181261.8 of Chinese patent application filed on April 30, 2014, the entire contents of which are incorporated herein by reference.

Technical field

[0002] The present invention relates to the technical field of medical equipment, and more particularly to a medical pendant box body and posts used for the medical pendant box body.

Background art

[0003] Medical pendant is an indispensable medical equipment used in modern hospital operating room, intensive care unit and the like, and various accessories such as handle, laminate and the like are often needed to be fixed (installed) to the medical pendant so as to achieve various functions. The main structure of a medical pendant is a box body. Therefore, in order to achieve the mechanical connection and electrical connection to various medical accessories, various mechanical interfaces and electrical interfaces are needed to be set on the medical pendant box body.

[0004] The medical pendant box body of the prior art has the following drawbacks:

(1) Since the structure and/or the appearance of the medical pendant box bodies are different, the modes for the interfaces thereof are also different from each other, and switch connection block is needed to be installed if various interfaces are to be interchanged;
(2) It is needed to complicatedly connect electrical cables with very large time consumption;
(3) The position of a medical accessory is fixed and the height and/or position thereof cannot be freely adjusted.

Summary of invention

[0005] One of the purposes of the present invention is to overcome the above-mentioned disadvantages of the existing medical pendant box body, there is provided a medical pendant box body which can have standardised interfaces, without complicatedly connecting electrical cables, being easy for disassembly and assembly, and the position of a medical accessory capable of being freely adjusted.

[0006] The above purposes of the present invention are achieved by a medical pendant box body, the medical pendant box body comprises at least two panels, at least two posts extending along the longitudinal direction of the medical pendant box body, an upper base plate and a lower base plate, the at least two panels are respectively fixed to the at least two posts, the upper base plate and the lower base plate are respectively fixed to the upper edge and the lower edge of each panel of the at least two panels, at least one post of the at least two posts is provided with an electrical interface, the electrical interface comprises an inner groove located on the post and extending along the longitudinal direction of the post, an insulator accommodated within the inner groove, and a conductor sealed within the insulator.

[0007] According to the technical solutions described above, the medical pendant box body of the present invention can have the following advantageous technical effects: a standardised interface can be provided, it is not necessary to connect electrical cables in a complicated manner, disassembly is easy and the position of a medical accessory can be freely adjusted.

[0008] Preferably, the inner groove is substantially filled when the insulator is accommodated within the inner groove and the conductor is sealed within the insulator.

[0009] According to the technical solutions described above, the medical pendant box body of the present invention can have the following advantageous technical effects: the electrical interface has good reliability and insulation performance, effectively prevents the infiltration of water or other cleaning agents during the cleaning process in a hospital.

[0010] Preferably, the number of the insulators within the inner groove is two, and one conductor is sealed within each insulator.

[0011] According to the technical solutions described above, the medical pendant box body of the present invention can have the following advantageous technical effects: by means of the appropriate number and settings of the above insulators and conductors, the simple and reliable connection between the plug of the electrical accessory and the conductor inside the post can be achieved.

[0012] Preferably, the cross section of the conductors is substantially Y-shaped or Ω-shaped.

[0013] According to the technical solutions described above, the medical pendant box body of the present invention can have the following advantageous technical effects: by means of the appropriate shape of the above conductors, the simpler and reliable connection between the plug of the electrical accessory and the conductor inside the post can be achieved.

[0014] Preferably, the insulator comprises an insulator front part and an insulator rear part, the conductor is sealed within the insulator rear part, the insulator front part has a substantially flat front surface and a gap extending along the longitudinal direction of the medical pendant box body.

[0015] According to the technical solutions described above, the medical pendant box body of the present invention can have the following advantageous technical effects: the gap can be provided for inserting the plug of the electrical accessory, which facilitates the simpler and reliable connection between the plug of the electrical ac-

cessory and the conductor inside the post.

[0016] Preferably, the width size of the gap and the elasticity of the insulator front part are designed so that the gap can be provided for inserting the plug of an electrical accessory and the insulator front part is substantially sealed before inserting the plug.

[0017] According to the technical solutions described above, the medical pendant box body of the present invention can have the following advantageous technical effects: the simpler and reliable connection between the plug of the electrical accessory and the conductor inside the post is achieved, meanwhile effectively preventing the infiltration of water or other cleaning agents during the cleaning process in a hospital.

[0018] Preferably, the width size of the inner groove and the elasticity of the insulator are designed to make the insulator produce necessary predeformation so as to produce certain pre-pressure, so that when the plug of an electrical accessory is inserted into the electrical interface to connect to the conductor, the pre-pressure prevents the plug from disengaging from the conductor.

[0019] According to the technical solutions described above, the medical pendant box body of the present invention can have the following advantageous technical effects: the reliability of the connection between the plug of the electrical accessory and the conductor is improved, and the disengagement of the plug from the conductor is effectively prevented.

[0020] Preferably, the conductor is connected to the control board of the medical pendant via a connector.

[0021] According to the technical solutions described above, the medical pendant box body of the present invention can have the following advantageous technical effect: multiple functions such as air brake control, electromagnetic brake control, motor control, direct current supply, video or audio signal supply and the like can be accomplished by means of the control board.

[0022] Preferably, at least one post of the at least two posts is also provided with a mechanical interface, the mechanical interface comprising a concave curved portion or a convex curved portion for matching to the convex curved portion or the concave curved portion of a mechanical connecting piece.

[0023] According to the technical solutions described above, the medical pendant box body of the present invention can have the following advantageous technical effects: by means of the same post in the medical pendant box body, both the mechanical connection and the electrical connection can be achieved, the number of the components needed is reduced, and the connection reliability is improved; furthermore, a medical accessory is easy to be disassembled and assembled, and the position of the medical accessory can be freely and steplessly adjusted.

[0024] Preferably, the mechanical connecting piece is used for installing a medical accessory.

[0025] According to the technical solutions described above, the medical pendant box body of the present invention can have the following advantageous technical effects: the medical accessory can be freely adjusted with respect to its height and/or position and can be simply and reliably installed to the medical pendant box body.

[0026] The above purposes of the present invention are also achieved by a post used for the medical pendant box body, the post extends along the longitudinal direction of the medical pendant box body, the post is provided with an electrical interface, the electrical interface comprises an inner groove located on the post and extending along the longitudinal direction of the post, an insulator accommodated within the inner groove, and a conductor sealed within the insulator.

[0027] According to the technical solutions described above, the post used for the medical pendant box body of the present invention can have the following advantageous technical effects: by means of the innovative design of the post used for the medical pendant box body, the medical pendant box body can possess a standardised interface, without complicatedly connecting electrical cables, being easy for disassembly and assembly, and the position of a medical accessory capable of being freely adjusted.

Brief description of drawings

[0028]

Figure 1 is the three-dimensional view for the medical pendant box body of an embodiment of the present invention.

Figure 2 is the three-dimensional view for the medical pendant box body of an embodiment of the present invention, in which the upper base plate is removed for clarity.

Figure 3 is the top view of the medical pendant box body shown in figure 2.

Figure 4 is a partial enlarged view of a portion of the lower part in figure 3, especially showing the electrical interface and the mechanical interface of the post in the medical pendant box body.

Sign list for drawings:

[0029]

1. panel;
2. post;
3. upper base plate;
4. lower base plate;
10. medical pendant box body;
21. inner groove;
22. insulator;
23. conductor;
24. connector;
25. concave curved portion;
31. mechanical connecting piece;
35. convex curved portion;

221. insulator front part;
222. insulator rear part;
223. gap.

Detailed Description

[0030] The present invention is further described in connection with drawings and particular embodiments as follows and elaborated in more detail in the following description in order to fully understand the present invention, but it is evident that the present invention can be implemented in many other ways which are different from those described herein; generalization and deduction can be made by a skilled in the art without departing from the connotation of the invention according to practical application, and therefore the protective scope of the present invention should not be limited by the specific content of embodiments of the present invention herein.

[0031] Figure 1 and figure 2 respectively show the three-dimensional views for the medical pendant box body 10 of an embodiment of the present invention, in which the upper base plate is removed from the medical pendant box body 10 in figure 2 for clarity. Figure 3 shows the top view of the medical pendant box body 10 shown in figure 2. Figure 4 shows a partial enlarged view of a portion of the lower part in figure 3, especially showing the electrical interface and the mechanical interface of the post 2 in the medical pendant box body 10.

[0032] The medical pendant box body 10 of the present invention comprises at least two panels 1, at least two posts 2 extending along the longitudinal direction of the medical pendant box body, an upper base plate 3 and a lower base plate 4; the at least two panels 1 are respectively fixed to the at least two posts 2, the upper base plate 3 and the lower base plate 4 are fixed to the upper edge and the lower edge of each panel 1 of at least two panels 1, respectively.

[0033] Note that, "upper", "lower", "front", "rear", "left", "right" and the like used herein are only exemplary directions defined to facilitate the description of the invention, as shown in figure 3, the direction toward the reader is "upper", the direction away from the reader is "lower", the direction of the bottom side in the paper is "front", the direction of the top side in the paper is "rear", the direction of the left side in the paper is "left", and the direction of the right side in the paper is "right". Of course, those skilled in the art on the basis of the present invention can understood that "upper", "lower", "front", "rear", "left", "right" and other directions can also be defined in other ways, which also fall into the protective scope of the present invention.

[0034] As shown in figure 4, at least one post 2 of the at least two posts is provided with an electrical interface, the electrical interface comprises an inner groove 21 located on the post 2 and extending along the longitudinal direction of the post, an insulator 22 accommodated within the inner groove 21, and a conductor 23 sealed within the insulator 22.

[0035] In this way, the medical pendant box body of the present invention can possess a standardised electrical interface, without complicatedly connecting electrical cables, being easy for disassembly and assembly, and the position of a medical accessory capable of being freely adjusted.

[0036] As shown in figure 4, at least one post 2 of the at least two posts is also provided with a mechanical interface, the mechanical interface comprising a concave curved portion 25 for matching to the convex curved portion 35 of the mechanical connecting piece 31.

[0037] In this way, the medical pendant box body of the present invention can possess a standardised mechanical interface, being easy for disassembly and assembly, and the position of a medical accessory capable of being freely adjusted. Furthermore, by means of the same post in the medical pendant box body, both the mechanical connection and the electrical connection can be achieved, the number of the components needed is reduced, and the connection reliability is improved.

[0038] Although the examples given above only describe the circumstance with respect to the matching of the concave curved portion of the post to the convex curved portion of the mechanical connecting piece, a person skilled in the art on the basis of the present invention should understand that the form of matching of the convex curved portion of the post to the concave curved portion of the mechanical connecting piece can also be used. Such variation also falls into the protection scope of the present invention.

[0039] Preferably, as shown in figures 1 and 2, posts 2 extend along the longitudinal direction of the medical pendant box body 10 and passing through the entire length of the medical pendant box body 10. In this way, by means of a mechanical connecting piece, the location of the medical accessories can be steplessly adjusted along the longitudinal direction of the medical pendant box body.

[0040] Preferably, the inner groove 21 extends across the entire length of the post 2. Preferably, as shown in figure 4, the inner groove 21 is located at the front surface of the post 2. In this way, it is easy for the extrusion molding of the post, effectively reducing the processing cost. Preferably, the number of the inner groove 21 on the post 2 is only one. In this way, the simple and reliable electrical connection is realized, meanwhile simplifying the structural design of the post and reducing the processing cost.

[0041] Preferably, the insulator 22 extends along the longitudinal direction of the post. Preferably, the insulator 22 also extends across the entire length of the post 2.

[0042] Preferably, the conductor 23 extends along the longitudinal direction of the post. Preferably, the conductor 23 also extends across the entire length of the post 2.

[0043] In this way, the medical pendant box body of the present invention can freely adjust the position of a medical accessory across the entire length of the post (or the entire length of the medical pendant box body), and easily and quickly realize the electrical connection

and/or the mechanical connection.

[0044] Preferably, as shown in figure 4, the inner groove 21 is substantially filled when the insulator 22 is accommodated within the inner groove 21 and the conductor 23 is sealed within the insulator 22.

[0045] In this way, the electrical interface has good reliability and insulation performance, effectively preventing the infiltration of water or other cleaning agents during the cleaning process in a hospital.

[0046] Preferably, as shown in figure 4, the number of the insulators 22 within the inner groove 21 is two, and one conductor 23 is sealed within each insulator 22. Preferably, the insulator 22 comprises an insulator front part 221 and an insulator rear part 222. Preferably, the insulator front parts 221 of the two insulators 22 can be formed integrally so as to effectively prevent the infiltration of water or other cleaning agents during the cleaning process in a hospital.

[0047] Preferably, as shown in figure 4, the cross section of the conductor 23 is substantially Y-shaped. Of course, those skilled in the art on the basis of the present invention can understood that the cross section of the conductor 23 can also be substantially Ω-shaped.

[0048] In this way, by means of the appropriate settings of the shape and number of the above insulators and conductors, the simple and reliable connection between the plug of the electrical accessory and the conductor inside the post can be achieved.

[0049] Preferably, as shown in figure 4, in the case that the insulator 22 comprises an insulator front part 221 and an insulator rear part 222, the conductor 23 is sealed within the insulator rear part 222, the insulator front part 221 has a substantially flat front surface and a gap 223 extending along the longitudinal direction of the medical pendant box body.

[0050] Preferably, the insulator 22 (comprising an insulator front part 221 and/or an insulator rear part 222) should possess a certain elasticity. For example, the insulator front part 221 possesses a certain elasticity. Again, for example, the insulator rear part 222 possesses a certain elasticity. Again, for example, both the insulator front part 221 and the insulator rear part 222 possess a certain elasticity.

[0051] Preferably, the width size of the gap 223 and the elasticity of the insulator front part 222 are designed so that the gap 223 can be provided for inserting the plug of the electrical accessory and the insulator front part 221 is substantially sealed before inserting the plug.

[0052] Preferably, the width size of the inner groove 21 and the elasticity of the insulator 22 are designed to make the insulator 22 (especially insulator rear part 222) produce necessary predeformation so as to produce certain pre-pressure, so that when the plug of an electrical accessory is inserted into the electrical interface to connect to the conductor 23, the pre-pressure prevents the plug from disengaging from the conductor 23.

[0053] Preferably, as shown in figure 4, the conductor 23 is connected to the control board of the medical pendant via a connector 24.

[0054] Preferably, the mechanical connecting piece 31 can be used for installing various medical accessories, for example, a control handle, an infusion pole, a display arm, a medical guide rail, etc.

[0055] The height of the medical accessories can be arbitrarily adjusted after the medical accessories are installed on the interfaces of the posts, and they can be interchanged on different posts.

[0056] The conductor 23 provided in post 2 can achieve multiple functions, for example, providing air brake control, electromagnetic brake control, and motor control which are needed for controlling the medical pendant; providing direct current supply, for example, an environment lamp can be directly installed on the conductor; realizing the simultaneous supply of the power and control signals; and supplying video or audio signals, such as the data of a pulsimeter, etc.

[0057] The present invention has been exemplarily described above in connection with the figures, although the specific implementations of the present invention are not limited to the above embodiments. Various modifications or variations can be made by a person skilled in the art on the premise of without departing from the technical concept of the present invention, and such modifications or variations of course fall within the protection scope of the present invention.

Claims

1. A medical pendant box body, **characterized in that** the medical pendant box body comprises at least two panels, at least two posts extending along the longitudinal direction of the medical pendant box body, an upper base plate and a lower base plate; the at least two panels are respectively fixed to the at least two posts, the upper base plate and the lower base plate are respectively fixed to the upper edge and the lower edge of each panel of the at least two panels, at least one post of the at least two posts is provided with an electrical interface, the electrical interface comprises an inner groove located on the post and extending along the longitudinal direction of the post, an insulator accommodated within the inner groove, and a conductor sealed within the insulator.

2. The medical pendant box body of claim 1, wherein the inner groove is substantially filled when the insulator is accommodated within the inner groove and the conductor is sealed within the insulator.

3. The medical pendant box body of claim 1, wherein the number of the insulators within the inner groove is two, and one conductor is sealed within each insulator.

4. The medical pendant box body of claim 1, wherein the cross section of the conductor is substantially Y-shaped or Ω-shaped.

5. The medical pendant box body of claim 1, wherein the insulator comprises an insulator front part and an insulator rear part, the conductor is sealed within the insulator rear part, the insulator front part has a substantially flat front surface and a gap extending along the longitudinal direction of the medical pendant box body.

6. The medical pendant box body of claim 5, wherein the width size of the gap and the elasticity of the insulator front part are designed so that the gap can be provided for inserting the plug of an electrical accessory and the insulator front part is substantially sealed before inserting the plug.

7. The medical pendant box body of claim 1, wherein the width size of the inner groove and the elasticity of the insulator are designed to make the insulator produce necessary predeformation so as to produce certain pre-pressure, so that when the plug of an electrical accessory is inserted into the electrical interface to connect to the conductor, the pre-pressure prevents the plug from disengaging from the conductor.

8. The medical pendant box body of claim 1, wherein the conductor is connected to the control board of the medical pendant via a connector.

9. The medical pendant box body of claim 1, wherein at least one post of the at least two posts is also provided with a mechanical interface, the mechanical interface comprising a concave curved portion or a convex curved portion for matching to the convex curved portion or the concave curved portion of a mechanical connecting piece.

10. The medical pendant box body of claim 9, wherein the mechanical connecting piece is used for installing a medical accessory.

11. A post used for a medical pendant box body, **characterized in that** the post extends along the longitudinal direction of the medical pendant box body, the post is provided with an electrical interface, the electrical interface comprises an inner groove located on the post and extending along the longitudinal direction of the post, an insulator accommodated within the inner groove, and a conductor sealed within the insulator.

12. The post used for a medical pendant box body of claim 11, wherein the inner groove is substantially filled when the insulator is accommodated within the inner groove and the conductor is sealed within the insulator.

13. The post used for a medical pendant box body of claim 11, wherein the number of the insulators within the inner groove is two, and one conductor is sealed within each insulator.

14. The post used for a medical pendant box body of claim 11, wherein the cross section of the conductor is substantially Y-shaped or Ω-shaped.

15. The post used for a medical pendant box body of claim 11, wherein the insulator comprises an insulator front part and an insulator rear part, the conductor is sealed within the insulator rear part, the insulator front part has a substantially flat front surface and a gap extending along the longitudinal direction of the medical pendant box body.

16. The post used for a medical pendant box body of claim 15, wherein the width size of the gap and the elasticity of the insulator front part are designed so that the gap can be provided for inserting the plug of an electrical accessory and the insulator front part is substantially sealed before inserting the plug.

17. The post used for a medical pendant box body of claim 11, wherein the width size of the inner groove and the elasticity of the insulator are designed to make the insulator produce necessary predeformation so as to produce certain pre-pressure, so that when the plug of an electrical accessory is inserted into the electrical interface to connect to the conductor, the pre-pressure prevents the plug from disengaging from the conductor.

18. The post used for a medical pendant box body of claim 11, wherein the conductor is connected to the control board of the medical pendant via a connector.

19. The post used for a medical pendant box body of claim 11, wherein at least one post of the at least two posts is also provided with a mechanical interface, the mechanical interface comprising a concave curved portion or a convex curved portion for matching to the convex curved portion or the concave curved portion of a mechanical connecting piece.

20. The post used for a medical pendant box body of claim 19, wherein the mechanical connecting piece is used for installing a medical accessory.

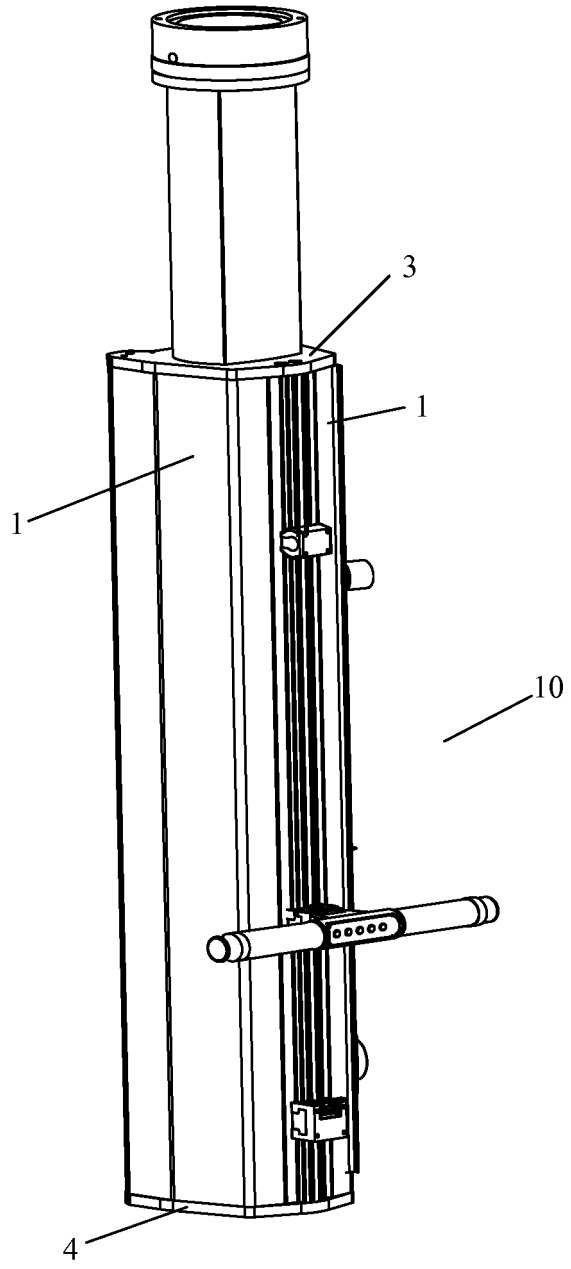

FIG. 1

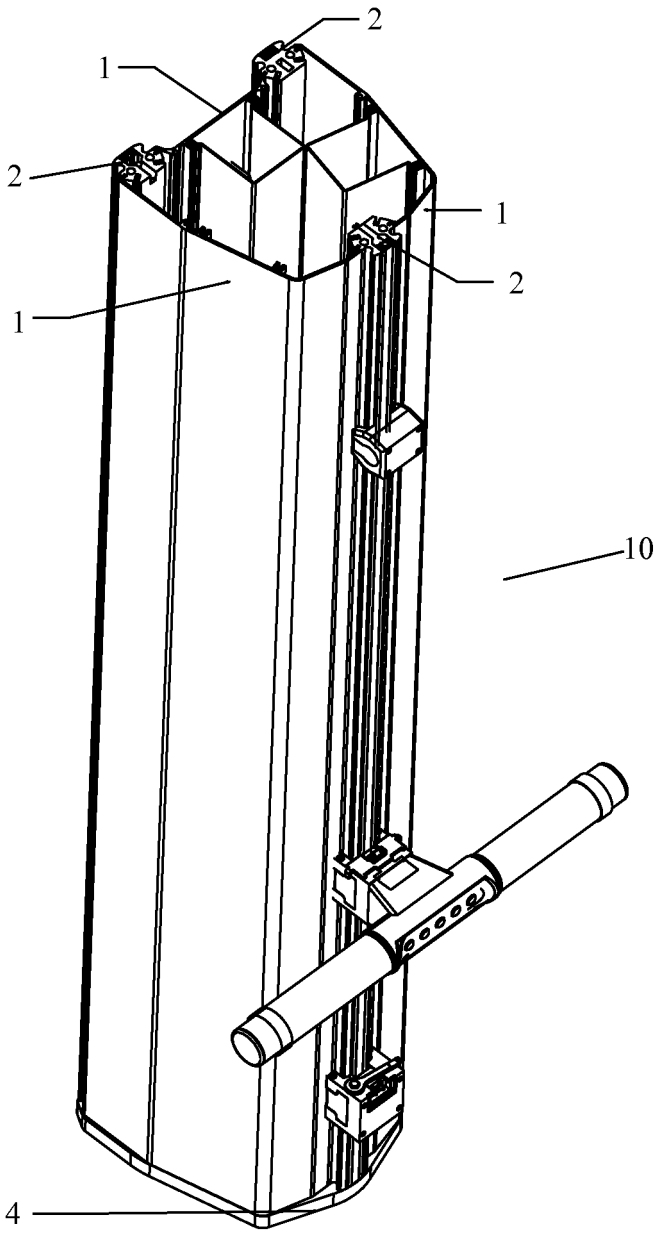

FIG. 2

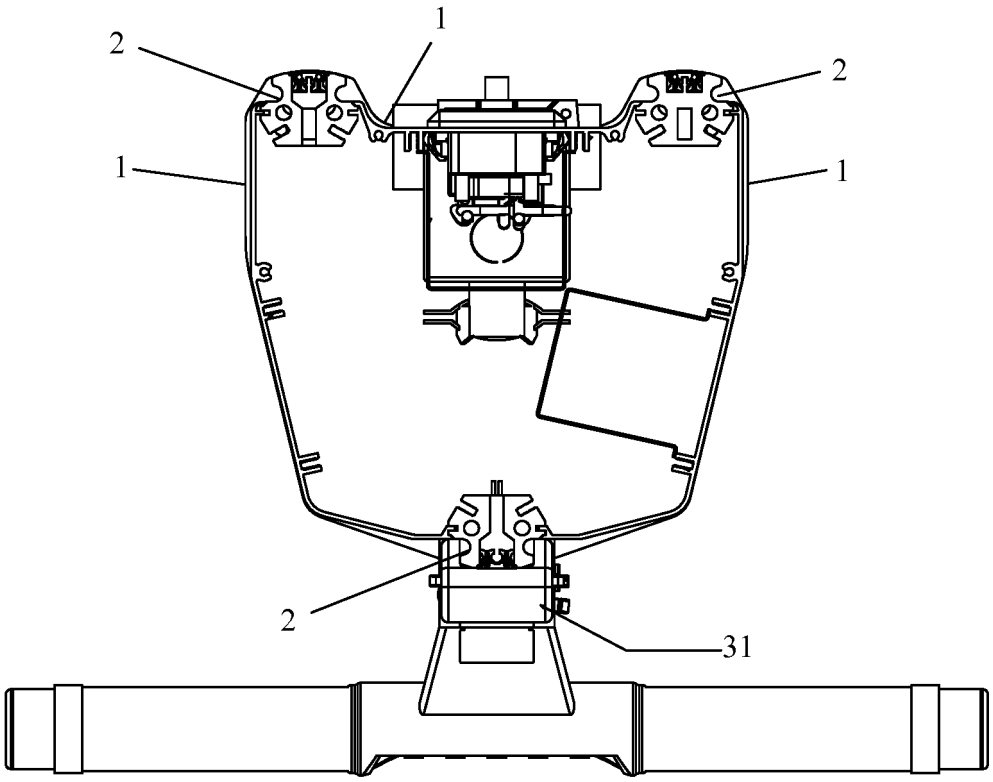

FIG. 3

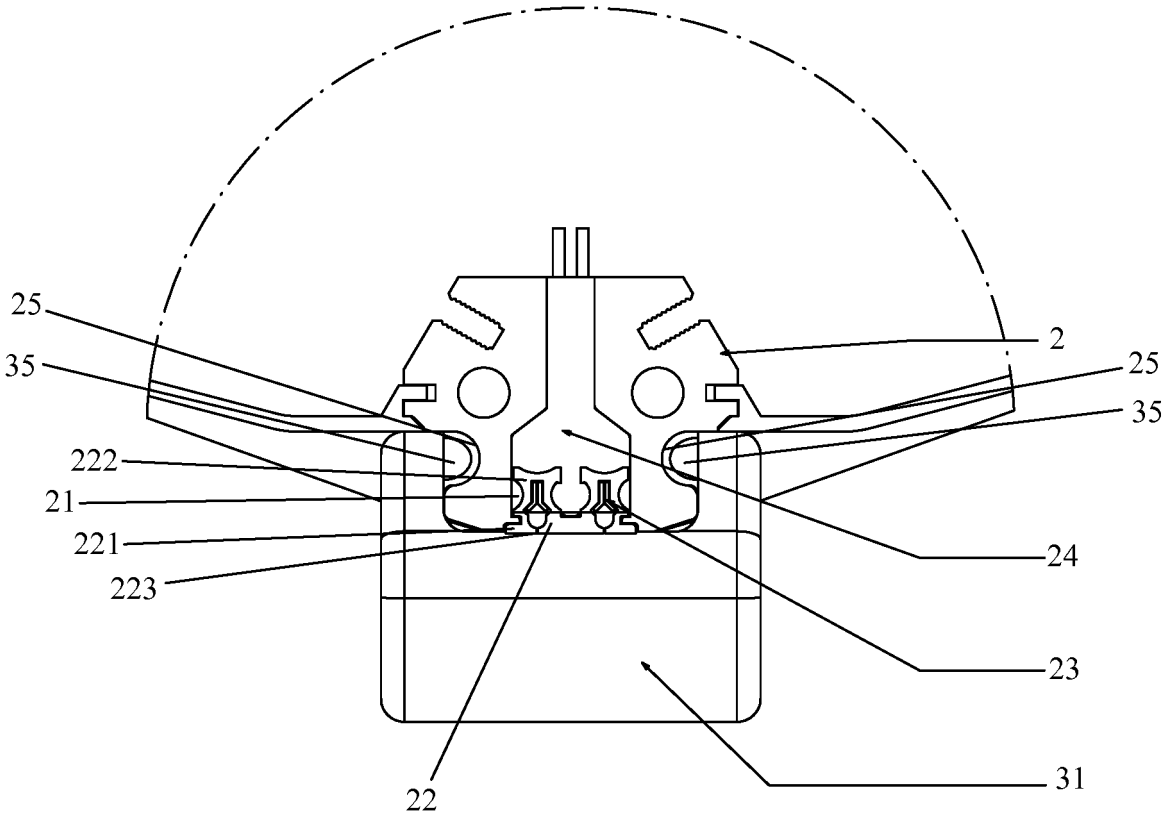

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2014/083513

A. CLASSIFICATION OF SUBJECT MATTER

A61B 19/00 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNKI, CNPAT, WPI, EPODOC: medical + surgery + icu + intensive care, crane tower + suspension bridge, column, electric + power + socket +plug Medical, surgical, intensive care unit, Crane, tower, Electric+, interface

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 201710467 U (NANJING MINDRAY BIO-MEDICAL ELECTRONICS CO., LTD.), 19 January 2011 (19.01.2011), description, paragraphs 16-27, and figures 1-6	1-20
Y	CN 103591425 A (MAQUET (SUZHOU) CO., LTD.), 19 February 2014 (19.02.2014), description, paragraphs 39-56, and figures 2-7	1-20
PX	CN 103919615 A (MAQUET (SUZHOU) CO., LTD.), 16 July 2014 (16.07.2014), claims 1-20	1-20
E	CN 203815593 U (MAQUET (SUZHOU) CO., LTD.), 10 September 2014 (10.09.2014), claims 1-20	1-20
E	CN 104055576 A (MAQUET (SUZHOU) CO., LTD.), 24 September 2014 (24.09.2014), description, paragraphs 106-126, and figures 1-6	11-15, 18-20
A	US 2013307237 A1 (SYNCMOLD ENTERPRISE CORP.), 21 November 2013 (21.11.2013), the whole document	1-20

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
04 January 2015 (04.01.2015)	**28 January 2015 (28.01.2015)**
Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer **YIN, Huayu** Telephone No.: (86-10) **61648429**

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2014/083513

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 201710467 U	19 January 2011	None	
CN 103591425 A	19 February 2014	None	
CN 103919615 A	16 July 2014	None	
CN 203815593 U	10 September 2014	None	
CN 104055576 A	24 September 2014	CN 103294070 A	11 September 2013
		CN 203829052 U	17 September 2014
		WO 2014201960 A1	24 December 2014
US 2013307237 A1	21 November 2013	TW 201347743 A	01 December 2013

Form PCT/ISA/210 (patent family annex) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 201410181261 **[0001]**